REMARKS

Applicant graciously appreciates the Office's attention to the instant application. Applicant requested an Examiner's Interview, however, an interview was not scheduled prior to the 3-month date due to the Office's workload. In a brief telephonic conversation on Monday, September 12, the Office indicated that a substantive interview could be held after receipt of the instant communication and prior to the next Office Action. Applicant appreciates the Office's intention to discuss the claimed subject matter and, as appropriate, amendments to the instant claims or introduction of new claims. A Request for Continued Examiner (RCE) is filed concurrently herewith.

In view of the following remarks, Applicant respectfully requests reconsideration and allowance of the pending claims of the instant application. This response is believed to be fully responsive to all issues raised in the June 15, 2005 Office Action.

Claims 23 and 64 are currently amended. Accordingly, claims 1-33, 35-39, 50-62, 64-70, 72-73, 79 and 80 are pending.

Background for MPEG-2

Applicant submits for the Office's consideration, a non-prior art article entitled "High-Definition Movies from Your PC", by Megenity, The Perfect Vision, Vol. 50, September/October 2003, a copy of which is attached hereto (referred to as the TPV-50 article). This article discusses WINDOWS MEDIA™ 9 ["WM9"] and MPEG-2.

Applicant submits the TPV-50 article to help the Office in understanding various aspects of the technology presented in the instant application as well as claimed subject matter. In the instance that this article is required for purposes of overcoming a prima facie obviousness rejection under 35 U.S.C. §103, then Applicant will re-submit this article or other objective evidence in conjunction with a declaration under 37 C.F.R. §1.132.

The TPV-50 article discusses a process whereby film is telecined, encoded, distributed and then decoded. Applicant specifically draws the Office's attention to issues related to the MPEG-2 codec. In particular, the TPV-50 article states:

> The fine color shadings of the cell walls revealed a lot of blockiness from the MPEG-2 encoding on the DVD version; this blockiness was completely absent on the WM9 HD version.

TPV-50 (2003).

In the prior Response, Applicant amended various claims to recite processing to remove blockiness. While the instant specification is full of examples and comparisons with the MPEG-2 codec, Applicant hopes that the TPV-50 article helps to offer further clarification as to differences between the instant subject matter and the MPEG-2 standard. For example, the MPEG-2 standard has blockiness issues when compared with WM9, which is explicitly recited in dependent claim 17.

Applicant also directs the Office to the "MPEG Background" section of USPN 6606746 to Zdepski (col. 1, line 60 to col. 2, line 39) and to the "MPEG Background" section of USPN 6507672 to Watkins (col. 2, line 1 to col. 5, line 64). Applicant submits that such information sheds light on encoding and

decoding blocks of MPEG-2, which are at the root of issues related to blockiness. In turn, such issues limit usefulness of the MPEG-2 codec (e.g., quality, compression limits, etc.).

Rejection of Claims under 35 U.S.C. §103(a)

The Office relies on USPN 6864913 to Tarnoff et al. (Tarnoff), USPN 6606746 to Zdepski et al. (Zdepski), USPN 6507672 to Watkins et al. (Watkins), USPN 6801576 to Haldeman et al. (Haldeman), and USPN 6631205 to Melen et al. (Melen) to make the following §103 rejections:

(i) Claims 1-11, 20, 41, and 76 based on Tarnoff in view of Zdepski;

(ii) Claims 12-16, 19, 21-33, 35-39, 43-45, 50-62, 64-70, 73, 79-80 based on Tarnoff in view of Zdepski and further in view of Watkins;

(iii) Claims 17 and 18 based on Tarnoff in view of Zdepski and further in view of Haldeman; and

(iv) Claim 72 based on Tarnoff in view of Zdepski and further in view of Melen.

All of these §103 rejections rely on the combination of Tarnoff and Zdepski. Obviousness under §103 requires (i) some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (ii) a reasonable expectation of success; and (iii) that the prior art reference (or references when combined) must teach or suggest all the claim limitations, see MPEP §2143. As explained below, Applicant respectfully submits

that the combination of Tarnoff and Zpedski does not render the claimed subject matter obvious.

Claims 1-11, 20, 41, and 76

Claim 1 recites:

> *converting an analog 35 mm or 16 mm film of duration greater than 1 hour to digital video data with a frame rate of approximately 24 frames per second and one pixel or line resolution of at least approximately 1280;*
>
> *storing the digital video data to a storage using an audio video interleaved file format;*
>
> *receiving the digital video data from the storage;*
>
> *compressing the received digital video data to produce compressed digital video using an average compression ratio of at least approximately 50:1 amenable to subsequent decompression using processing to remove blockiness; and*
>
> *transmitting the compressed digital video data via a network.*

According to MPEP §2141.02, the claimed subject matter should be considered as a whole. As a whole, the claimed subject matter overcomes various issues associated with the MPEG-2 standard. From page 2 to page 64, the instant specification discusses such MPEG-2 issues in depth. For example, see page 2, line 19 to page 3, line 6:

> In general, MPEG-2 compression ratios are typically confined to somewhere between approximately 8:1 and approximately 30:1, which some have referred to as the MPEG-2 compression "sweet spot". Further, with MPEG-2, transparency (i.e., no noticeable discrepancies between source video and reconstructed video)

> occurs only for conservative compression ratios, for example, between approximately 8:1 and approximately 12:1. Of course, such conservative compression ratios are inadequate to allow for storage of the aforementioned 130 Mbps, 2 hour video on a DVD disk. Thus, to achieve a high degree of transparency, source content is often pre-processed (e.g., re-sampled) prior to MPEG-2 compression or lower resolution source content is used, for example, 352 pixel by 480 lines at a frame rate of 24 fps and a color depth of 16 bits. Two hours of such lower resolution content requires a compression ratio of approximately 12:1 to fit a single sided DVD disk.

Specification at page 2, line 19 to page 3, line 6.

Further, there is no evidence of record to indicate that the MPEG-2 standard includes processing to reduce blockiness. Applicant refers the Office to the TPV-50 article, which indicates that MPEG-2 has blockiness issues. Consequently, for a variety of reasons, the MPEG-2 standard is inadequate for compression and decompression of video where, for example, one pixel or line resolution is of at least approximately 1280, as recited in claim 1.

While Zpedski discloses MPEG-1 and MPEG-2 standards, which adequately represents the state of the prior art, it does not disclose the subject matter of claim 1, alone or in combination with Tarnoff. For at least the foregoing reasons, Applicant submits that claim 1 is patentable over Tarnoff and Zdepski.

Claims 2-11, 20 and 41 depend on claim 1 and are believed patentable for at least the same reasons as claim 1. Claim 76 recites a computer-readable medium that essentially mirrors the subject matter of claim 1. Consequently, Applicant submits that claim 76 is patentable over Tarnoff and Zdpeski.

Claims 12-16, 19, 21-33, 35-39, 43-45, 50-62, 64-70, 73, 79-80

The Office rejected claims 12-16, 19, 21-33, 35-39, 43-45, 50-62, 64-70, 73, 79-80 over Tarnoff in view of Zdepski and further in view of Watkins. Applicant refers the Office to the foregoing discussion of Tarnoff and Zdepski.

With respect to Watkins, MPEG-1 and MPEG-2 are disclosed along with so-called noise immunity features for protection of anchor frames (col. 13, lines 26-36).

Claims 12-16, 19, 21-33, 35-39, and 43-45 depend on claim 1, which as argued above, is believed patentable over Tarnoff and Zdepski. Watkins fails to disclose or teach that which is lacking in Tarnoff and Zdepski. Applicant submits that for at least this reason, claims 12-16, 19, 21-33, 35-39 and 43-45 are patentable over the combination of Tarnoff, Zdepski and Watkins.

Claim 23, as currently amended, recites: *The method of claim 22, wherein the subsequent decompression and playback of the compressed digital video produces video of at least MPEG-2-based DVD quality.* Applicant submits that the combination of Tarnoff, Zdepski and Watkins fails to teach the subject matter of claim 23, as it depends on claims 22 and 1. In particular, none of these references disclose an average compression ratio of at least approximately 50:1 and subsequent decompression to produce video of at least MPEG-2-based DVD quality. For at least this reason, Applicant submits that claim 23 is independently patentable over Tarnoff, Zdepski and Watkins.

Claims 51-62, 64-70 and 73 depend on independent claim 50. Claim 50 recites, in relevant part:

> *receiving compressed digital video data via a network interface wherein the compressed digital video data has an average compression ratio of at least approximately 50:1;*
>
> *decompressing the compressed digital video data using a software decoder and processing to remove blockiness to produce decompressed digital video; and*

displaying the decompressed digital video data with one pixel or line resolution of at least 1280.

With respect to claim 50, Applicant reiterates the arguments for claim 1. Applicant submits that Watkins fails to disclose or teach that which is lacking in Tarnoff and Zdepski. In particular, the average compression ratio of at least approximately 50:1, the processing to remove blockiness and the displaying are not disclosed or taught. For at least this reason, Applicant submits that claim 50 and dependent claims 51-62, 64-70 and 73 are patentable over Tarnoff, Zdepski and Watkins.

Claim 64, as currently amended, recites: *The method of claim 50, wherein the displaying displays video of at least MPEG-2-based DVD quality.* Applicant submits that the combination of Tarnoff, Zdepski and Watkins fails to teach the subject matter of claim 64, as it depends on claim 50. In particular, none of these references disclose an average compression ratio of at least approximatley 50:1 and subsequent display of video of at least MPEG-2-based DVD quality. For at least this reason, Applicant submits that claim 64 is independently patentable over Tarnoff, Zdepski and Watkins.

Independent claims 79 and 80 recite, in part: *compressing the received digital video data to produce compressed digital video using an average compression ratio of at least approximately 50:1 amenable to subsequent decompression using processing to remove blockiness.* Applicant respectfully directs the Office to the foregoing arguments and evidence for claims 12-16, 19, 21-33, 35-39, 43-45, 50-62, 64-70, 73 as well as claim 1. For at least such

reasons, Applicant submits that claims 79 and 80 are patentable over the combination of Tarnoff, Zdepski and Watkins.

Claims 17 and 18

The Office rejected claims 17 and 18 based on Tarnoff in view of Zdepski and further in view of Haldeman. As claims 17 and 18 depend on independent claim 1, Applicant respectfully directs the Office to the foregoing discussion of Tarnoff and Zpedski. With respect to Haldeman, the context in which "Windows Media" is disclosed is relevant. Haldeman states:

> One of the ways that the prior art has used to reduce video bandwidth is to compress the video data before storing and distributing it on a network. Various compression schemes and data formats can be used. For example, MPEG, Windows Media, RealVideo, etc. can be used. Significant degradation or artifacts can be introduced into the video data as a result of a poorly implemented encoding process. These artifacts result in a lower-quality video/audio experience for the end-user.

Haldeman at col. 1, line 36-44.

Thus, Haldeman makes no distinction between "Windows Media" and MPEG. Applicant submits that such evidence is insufficient to sustain a prima facie case of obviousness under §103 given the strict evidentiary standard (MPEP §2143.01; In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002)). In particular, given such information, Applicant submits that one of ordinary skill in the art would not find Haldeman useful in addressing short-comings of the MPEG-2 standard.

Claim 72

The Office rejected claim 72 over Tarnoff in view of Zdepski and further in view of Melen. Claim 72 depends on independent claim 50. Applicant submits

that claim 50 is patentable over Tarnoff and Zdepski and that Melen does not disclose that which is lacking in Tarnoff and Zdepski. Consequently, Applicant submits that claim 72 is patenable over the combination of Tarnoff, Zdepski and Melen.

Conclusion

Pending claims 1-33, 35-39, 50-62, 64-70, 72-73, 79 and 80 are believed in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the subject application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Dated: 9-15-05

By:_____

Brian Pangrle
Reg. No. 42,973
Lee & Hayes, PLLC
(509) 324-9256

HOME THEATER NEWS & REVIEWS

8 HDTV Home Theaters RECOMMENDED

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Issue 50

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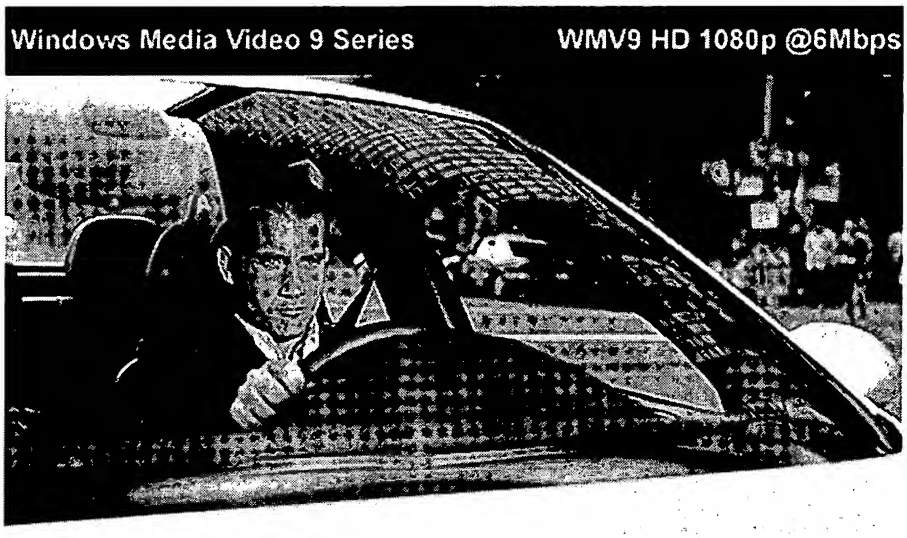


Nearly three years ago, I discovered one of the most exciting products I've ever come across: the Tele-Mann HiPix HDTV tuner card. This $399 card, with a built-in hi-def MPEG-2 decoder chip, enabled me to view and record over-the-air HDTV broadcasts on my PC. While the card was revolutionary at that time, there is another breakthrough I have been awaiting ever since. It's called "software HDTV decoding," and what it means in a nutshell is that you will be able to receive and watch HDTV from your PC *very* inexpensively. With software HDTV decoding, your computer's CPU does the math-intensive task of hi-def MPEG-2 processing, so an expensive tuner card with its own decoder chipset isn't necessary. All that would be needed is an ATSC tuner card and a software program to view or record the broadcasts.

The Windows Media 9 player not only supports video in standard DVD resolution (720x480), but it can also play back high-definition video at up to 1920x1080 resolution.

Today's fast CPUs are powerful enough for the task, so why are we still not seeing software HDTV decoding on the PC? Well, thanks to Microsoft, we finally are. While inexpensive ATSC tuner cards have still not made it to market, Microsoft has begun to release pre-recorded HD content that uses software decoding. The hi-def programs can be played back on most 2.4GHz or faster PCs, using the company's Windows Media Player 9—with no MPEG-2 decoder card needed.

Why Watch HD on a PC?

Before I describe HD on Windows Media 9, I have a feeling many people may be asking, "Why would I want to watch HDTV on my small PC monitor?" The answer is that you don't have to watch it just on your monitor—although hi-def can look stunning on a good PC monitor. Your PC is a perfectly good hi-def source that's capable of feeding your plasma, projector, or HD-ready RPTV. While few video cards have component-video output, the two brands of cards I find to work best for home-theater use (nVidia's GeForce-based and ATI's Radeon series cards) feature both VGA and DVI output, which you can use to feed your display. The most important factor when doing this is to use a utility called PowerStrip (available at www.entechtaiwan.com) to set your computer's output resolution to match the resolution of your display. (Most of the initial WM9 HD content is either 720p or 1080p, which is *higher* than some

displays can handle, especially HD-ready RPTVs. PowerStrip will let you create a lower resolution than 720p or 1080p, if needed, for your display, although you won't be seeing the full resolution encoded in the program material.) The program comes pre-loaded with resolutions to match just about every display on the market. I have two PowerStrip settings saved, depending on which display I am watching. There's 1360x768 for my D-ILA projector, and 1920x1080p for my Sony GDM-FW900 CRT monitor.

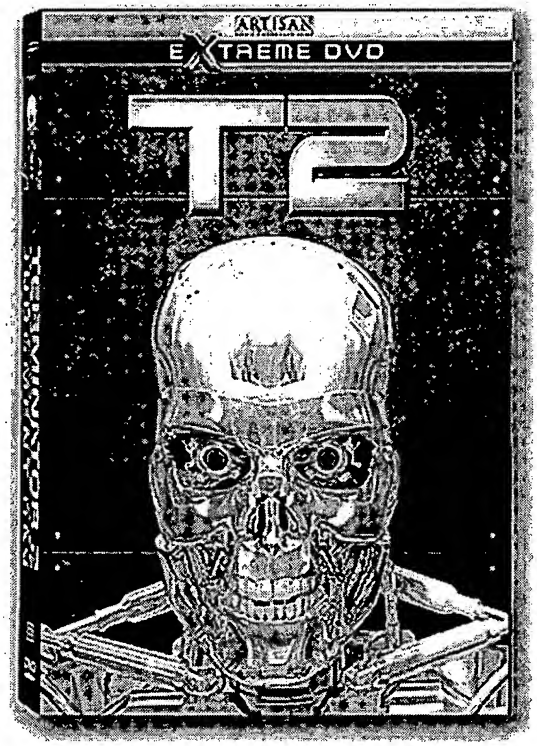
Does WM9 Do More With Less?

If you've used a new PC in the past year, you've probably had some exposure to a part of Windows XP called Media Player 9. Microsoft designed this program to do it all, and to be the only program you'll ever need to play back all types of media. From DVD to CD, MP3 to WMA to all types of video files, WM9 plays them all. But the coolest thing about WM9 is that the engineers who designed it also have a keen interest in HDTV. The player not only supports video in standard DVD resolution (720x480), but it can also play back HD video at up to 1920x1080 resolution. The files are encoded in Windows' WMV (Windows Media Video) format, which uses a far more aggressive compression scheme than the MPEG-2 encoding used for HDTV. On a standard-definition DVD movie, the video bit-rate ranges from about 4Mbs (megabits per second) to 9Mbs, depending on the amount of motion in the scene. If you've ever seen a DVD with a fast action sequence in which the image suddenly becomes very blocky, that's a sign that the data rate used at that moment wasn't high enough to show all the detail in the fast motion (this artifact is called macroblocking).

What's amazing about the hi-def content for WM9 is that it's only encoded at bit-rates of about 6–8Mbs for 720p, and 7–9Mbs for 1080p. Compare this to 19.4Mbs, the standard for HDTV broadcasts, or to the 25Mbs bit-rate of D-Theater movies! This compression enables an entire feature-length film to fit on one 4.7GB DVD-ROM—an amazing feat when you consider that at standard HDTV bit-rates, a two-hour movie uses about 18GB of storage. I was very skeptical when I first heard that Microsoft was encoding hi-def at such low rates. Knowing what's required for good quality at only DVD resolution, I couldn't imagine that it was possible for hi-def to look good at one-third the normal bit-rate.

T2: Extreme DVD Is the First

In May, Artisan Home Entertainment announced the first full-length movie to be released in the WM9 HD format. *Terminator 2: Extreme Edition* is a two-disc set that features both a remastered DVD version of the film (from a new 1080p telecine transfer), and a 1080p hi-def WMV version. Since I had this movie on D-VHS and DVD, I thought it would be a good starting point to evaluate the quality of the WM9 HD version.



In order of ascending video quality, the results went like this: original DVD, "Extreme Edition" DVD, D-VHS, and WM9 hi-def version. While the remastered DVD looked good, with little noise, it was still a bit soft in most scenes. The D-VHS version of this movie was not a good example of hi-def; it's one of the softer transfers that I've seen. The WM9 hi-def version was both sharper and cleaner than D-VHS and both DVD versions. It wasn't as sharp as the better HD movie transfers, but it was definitely the best version of the film that I've seen. Amazingly, my DVD software player showed a bit-rate for the remastered standard-def DVD of 9.8Mbs, which is higher than the bit-rate of the hi-def version!

While I was watching the WM9 version, I switched to a live HBO-HD broadcast of the movie *A Walk to Remember*. There was no comparison: The HBO movie had far more detail, better color rendition with a wider color gamut, and a more 3-D feel. So far, while the WM9 version looked good, it hadn't knocked my socks off with its amazing sharpness. To its credit, WM9's video noise and macroblocking were noticeably lower than in the DVD version. At about 15 minutes into the movie there are several shots inside Sarah Connor's cell. The fine color shadings of the cell walls revealed a lot of blockiness from the MPEG-2 encoding on the DVD version; this blockiness was completely absent on the WM9 HD version. So while WM9 wasn't incredibly sharp, at least my concerns about artifact problems from the low bit-rate were put to rest. (A note about the *T2* disc: Playing the HD version requires installation of InterActual's PCFriendly software, along with an Internet connection for activation. I am not a fan of InterActual, due to the company's privacy policies. If you install the software, be sure to go into Setup and disable the default setting of the program relaying information from your machine to InterActual.)

One other full-length feature has been released in WM9, along with a number of clips in the new hi-def format. (All HD content is listed on Microsoft's Web site at www.microsoft.com/windows/windowsmedia/content_provider/film/ContentShowcase.aspx.) I watched 'em all in the hope of being more wowed than I was with *T2*. The other feature film is *Standing in the Shadows of Motown*, another two-DVD set that features both DVD and WM9 versions of the movie. In this case, the WM9 version was not mastered at HD resolution, but at 1024x576, about 1.5 times the resolution of a regular DVD. The high-resolution version was sharper than the DVD—a performance by Joan Osborne showed detail in her hair and makeup that was not visible on the regular DVD. But the difference was subtle, and the hi-rez version was still fairly soft. Also, it was presented in a letterboxed format that can't be sized properly for a 16:9 display; it seemed to have been designed

for viewing on a 4:3 computer monitor. If you're looking for great hi-def image quality, this disc will be a disappointment.

But the saving grace was yet to come: Microsoft's "Do Amazing Things" DVD-ROM, available for only the cost of shipping, features three short HD featurettes from bmwfilms.com. As soon as I began watching *The Hostage*, I realized that my disappointment in the first two discs' video quality was not due to the WM9 HD format itself, but rather the source material and mastering. This movie, and the two others from bwmfilms.com, looked incredible. Everything was done right on them—it was evident they were shot well, telecined with care, and encoded carefully. The image sharpness was impressive, compared to what I had seen previously. Detail, color, and three-dimensionality were on par with the better HD movie transfers on HBO, although still not as good as the best HD broadcasts or movies. The blockiness that I expected from the low bit-rate was almost completely absent. These short films show that the WM9 HD format has incredible promise. At a resolution of 1280x720p, these movies are only encoded at 5.7Mbs—the same as an average DVD! Amazing.

I downloaded several hi-def clips from Microsoft's Web site, and was most impressed with "Coral Reef Adventure," available in both 720p and 1080p versions. This clip, shot on HD video, had a wider color gamut than NTSC with bright, bold, vivid colors. Several shots used an extremely wide-angle lens, giving that feeling of 3-D realism that is characteristic of the best video-sourced HD. The image sharpness was very good; however, that last bit of detail and three-dimensionality was lacking—it wasn't quite the "looking through a window" illusion that HD can convey.

WM9's HD Shows Promise

Although the first two theatrical releases were mildly disappointing, the bmwfilms.com featurettes and the short clips prove that hi-def on WM9 shows true promise. It's quite an accomplishment considering the bit-rate that is used, and WM9 could be a breakthrough for independent filmmakers shooting in HD to distribute their movies. Try downloading the clips from Microsoft's site, and see WM9's HD for yourself. While it doesn't provide the best HD image you'll ever see, Windows Media 9 is a great way to bring more hi-def content into your home—and that's never a bad thing.

THUMBS UP

- HD from your PC—cheap!
- Video quality can be good
- Reduced bit-rate doesn't seem to be a problem
- Bmwfilms.com featurettes in HD
- Opens door for more HD content

THUMBS DOWN

- Initial movie releases disappointing
- Will reduced bit-rate prove to be problem later?
- Not available with tuner card to receive HD broadcasts

Getting the Best Performance

Although my 2.4GHz Pentium 4 machine was able to play the various clips with few dropped frames, the demands of hi-def decoding are very taxing and require a powerful system. For the best results, you should use a 3.0GHz or faster CPU, have at least 512MB of RAM installed, and use a video card that has hardware MPEG-2 acceleration—that's a chip that offloads some of the HD-decoding work from the CPU to the videocard (both the Radeon and GeForce lines of cards have this feature). Also, keep in mind that if your video card is set to a resolution other than the resolution of the source video (for example, the source video is 1280x720 and your videocard is set to 1024x768), this means the card is re-scaling the video and some degradation or softening is bound to occur. The same is true if you have a fixed-pixel display (plasma or digital projector, for example) or a flat-panel LCD monitor, and you are sending it a resolution other than its native resolution. The fixed-pixel display will have to re-scale the image to its native resolution. Since the best re-scaling is no re-scaling at all, try to match your videocard and display's resolution to the source resolution whenever possible. For example, if you have a plasma TV with 1366x768 resolution, you may get better results with 1280x720 HD video by setting your PC to 1280x720 and setting the display to "pass-thru" mode so it doesn't re-scale the signal. You will have thin black bars on all four sides of the image, but the picture should be sharper and more vivid. **PM**

MANUFACTURER INFORMATION

WWW.MICROSOFT.COM
Prices: Free download for Windows Media Player 9 and hi-def clips; HD-DVD titles range from $18.99–$24.99